



With the inactive asparagine it is supposed by Erlenmeyer that prolonged heating in aqueous solution produces a rotation of this type, possibly to an unequal extent or in opposite directions in the *dextro*- and *laevo*-forms, whereby the products being no longer antipodes become separable by ordinary laboratory methods. It is too early yet to say whether, by exclusion of all asymmetric influences, the riddle has been solved, but it is easy to understand with what interest confirmation of Erlenmeyer's results is awaited.

Honours Students and Post-Graduate Scholarships.

In bringing this address to a conclusion, it will not be an innovation if I refer—it shall be only briefly—to the training of those who will carry on and amplify the work which we in this generation have attempted to do. This section stands for the advancement of chemistry which includes, so closely are pure and applied chemistry intertwined, the advancement of chemistry as applied to industry. Once again the cry has been raised in the Press⁶⁷ that chemists trained in our universities are of little value in industrial pursuits; they are too academic; they are not worth their wage—little as that often is, whether judged by a labourer's hire or the cost of a university training. It may be so. On the other hand, it is possible the employer obtains all that he pays for, and by paying more would receive in return much more by the inducement offered to more highly trained men to enter the field. Three years' training for the ordinary degree cannot carry a student very far in chemistry, and this preliminary training—for it is little more—is insufficient to equip the young graduate for more than routine work. With the honours student it is otherwise. He must either enter on his three years' residence at a university with a knowledge which does not fall below the requirements of the intermediate examination, and devote the greater part of his time to his honours subject, or he must be prepared to spend a fourth year to reach the necessary standard. More highly equipped in the academic sense than a man who has worked only for the ordinary degree, he undoubtedly is, yet there is seldom time to begin his training in research methods or in methods of commercial analysis where rapidity rather than extreme accuracy is the object in view.

Two reforms, I venture to think, are needed: the first would avoid early specialisation, which is apt to be disastrous, the second would encourage post-graduate training in directions where the student's inclinations or aptitude may be stimulated and developed. If the civic universities, established in virtue of charters drafted mainly on similar lines and inspired by similar aims, could come to some agreement requiring three years' residence, subsequent to the intermediate, for an honours degree in chemistry, the first reform would be effected—it is a measure for which a strong case can be made out. If, further, they could see their way to standardise their ordinances and regulations for the M.Sc. degree, cease to confer it on honours graduates of one or more years' seniority in return for payment of a fee, and confine

it to graduates—not necessarily honours graduates—who have carried out an approved piece of research during not less than one academic year, selection committees, boards of directors, or individual employers would have some clue to the type of man before them. I would go further and suggest that the interchange of honours graduates between the civic universities, or between them and other universities or colleges, if it could be arranged, would be of much benefit to the student himself. No university in this country is wealthy enough to attract to its service teachers who are pre-eminent in each branch of chemistry. How great, then, would be the gain to an honours graduate working for the M.Sc. degree, if, instead of being associated with the same teacher during the whole of his academic career, he could migrate from the place which had trained him to spend part, or the whole, of his time in the laboratory of an Armstrong, a Donnan, a Perkin, or a Ramsay, during that most critical period when he is sorting out his own ideas and learning how to use his fingers and his wits. But whether enforcement of the longer training for the honours degree be possible; whether a research degree as a step to the doctorate be desirable or practicable, there can be no doubt that the urgent need of the present time is the provision of scholarships and exhibitions, sufficient in value to secure at least a bare livelihood, for post-graduate work. He who is able to convert education committees and private donors to the view that a far better return for the money could be assured if part of the large expenditure on scholarships for matriculated or non-matriculated students were diverted to post-graduate purposes, will have done a service to science and the State the value of which, in my opinion, cannot be overestimated.

NOTES.

WE announce, with deep regret, the death, on Thursday last, of Sir Walter Noel Hartley, F.R.S., formerly professor of chemistry at the Royal College of Science, Dublin. He was in the sixty-eighth year of his age.

PROF. ARMINIUS VAMBÉRY, the Oriental scholar, died at Budapest on September 14, in his eighty-second year. The obituary article on him in *The Times* states that in 1851 the sum of 1000 florins was voted to him by the Hungarian Academy of Sciences on condition that he went into the interior of Asia to investigate the affinities of the Magyar tongue. In the following year he left for Persia, joining a caravan of Tartar pilgrims returning from Mecca. In no way intimidated by predictions of privations and dangers or by the melancholy fate of Conolly, Stoddart, Moorcroft, and others, he decided to maintain throughout the journey a strict disguise as a dervish. Leaving Teheran on March 28, 1863, Vambéry reached Khiva at the end of May, after intense sufferings from thirst in the trackless desert. In 1864 he visited London, gave an account of his travels at a meeting of the Royal Geographical Society, and did his best to convince public men in England of the necessity for the creation of a neutral zone or a geographical buffer State in Central Asia.

THE death is announced at Chatham, Ontario, of Dr. Alex. MacFarlane, in his sixty-third year. A native of Blairgowrie, he graduated at Edinburgh in

⁶⁷ Cf. *The Times*, Engineering Suppl., 1913, May 7, 21, 28, June 4, 11, 18.

1875, after a brilliant University career. The thesis by which he obtained the doctorate in 1878 was a remarkable experimental research into the conditions governing the electric spark. This brought him under the notice of Clerk Maxwell. In the same year he was elected F.R.S. Edinb. In 1885 Dr. MacFarlane was appointed to the chair of physics in the University of Texas. About fifteen years ago he took up his residence in Canada, where he continued to be actively engaged in physical and mathematical research. The latest of his many publications was a "Bibliography of Quaternions," issued in 1904.

ONE of the passengers killed in the disastrous New Haven Railway collision, which occurred on the same day as that at Aisgill, was Dr. Joseph Benson Marvin, professor of medicine and neurology at the University of Louisville. Dr. Marvin was born in Florida in 1852. At the age of eighteen he was appointed assistant professor of chemistry and physics at the Virginia Medical Institute. He then took a medical course, and afterwards held professorial posts at the Louisville Hospital College of Medicine, the Kentucky School of Medicine, and Kentucky University successively. Dr. Marvin's wife and daughter, who had been with him on a holiday in Maine, were also victims of the disaster.

CHANGES in the staff of the Central Research Institute at Kasauli are announced. Major W. F. Harvey, I.M.S., is taking the place of Sir David Semple as head of the institute, and Capt. J. W. McCoy, I.M.S., is to join the bacteriological department.

A BOARD for the study of tropical diseases has been established at Ponce, Porto Rico, by the Medical Department of the United States Army. The first president of the board is to be Major B. K. Ashford.

ACCORDING to *The Times*, arrangements are being made for an expedition to King Edward the Seventh's Land, in the south polar region, to start in August next. The leader is to be Mr. J. Foster Stackhouse, who was associated with Capt. Scott in organising the voyage of the *Terra Nova*. The present arrangements are that the members of the expedition shall sail from the Thames about the middle of August in the steam yacht *Polaris*, a ship especially built for ice navigation in accordance with designs approved by an international committee of explorers, including Charcot, de Gerlache, and Nansen. It is contemplated that the expedition will be absent for twenty months or more.

PARTICULARS of the plans of the Italian expedition to the Himalayas, which is to be led by Dr. Filippi are given in *The Pioneer Mail*. According to our contemporary the explorers will work in Karakoram throughout the summer of 1914, spend the autumn in Chinese Turkestan, and leave for Europe by about Christmas. It is the object of the leader to carry out observations across Chinese Turkestan into Russian Turkistan, to winter in Scardo in Baltistan, and early in the spring of 1914 to travel by the inner Indus valley to Leh. From the latter place the expedition will leave for the Karakoram district to survey and map the unknown portion of the Karakoram range

which lies between the Karakoram pass and the Siachen glacier. The Government of India, which has subscribed 1000l. towards the funds, has appointed Major Woods, of the Trigonometrical Survey, to accompany the expedition.

AMONG the communications to be made at the forthcoming meeting of German Naturalists and Medical Practitioners, at Vienna (September 21-28), we notice the following:—An address by Prof. von Behring on the prophylaxis of diphtheria, and papers on the development of the light and colour senses in the animal kingdom, vision, and the problem of race crossing in man by, respectively, Profs. von Hess, O. Lummer, and E. Fischer.

THE seventeenth annual fungus foray of the British Mycological Society, lasting a week, is to begin at Haslemere on September 22. The meeting place of the party will be the Hutchinson Museum. On September 24 the presidential address will be delivered by Mr. A. D. Cotton, who will take as his subject, "Some Suggestions as to the Study and Critical Revision of Certain Genera of Agaricaceæ." On the following day a paper, entitled "Recent Work on Resupinate Theleshoreæ," will be read by Miss E. M. Wakefield, and on September 26 Mr. J. Ramsbottom will read a paper entitled "Some Notes on the History of the Classification of the Discomycetes."

THE twenty-fourth annual general meeting of the Institution of Mining Engineers is to take place at Manchester on September 24-26, when the following papers will be read, or taken as read:—"A Method of Measuring Goaf Temperatures," T. F. Winnill; "The Absorption of Oxygen by Coal," T. F. Winnill; "Dust Problems in Mines and their Solution," Hermann Belger and A. Owen Jones; "Further Researches in the Microscopical Examination of Coal, especially in Relation to Spontaneous Combustion," James Lomax. In addition to the foregoing, the following papers, which have already appeared in the Transactions, will be open for discussion:—"Recent Methods of the Application of Stone-dust in Mines," Dr. W. E. Garforth; "The Reopening of Norton Colliery with Self-contained Breathing-apparatus after an Explosion," J. R. L. Allott; "The Slow Oxidation of Coal-dust and its Thermal Value," F. E. E. Lamplough and A. Muriel Hill; "Insulated and Bare Copper and Aluminium Cables for the Transmission of Electrical Energy, with Special Reference to Mining Work," B. Welbourn. In connection with the meeting a lecture on explosion experiments at Eskmeals will be given on September 25 by Prof. H. B. Dixon, F.R.S.

WE understand that the title of Prof. W. Ostwald's journal, *Annalen der Naturphilosophie*, has been changed to the more comprehensive one of *Annalen der Natur- und Kulturphilosophie*; also that Prof. R. Goldscheid is now associated with Prof. Ostwald in editing the periodical.

THE correspondent of *The Times* at Rome reports an interesting discovery made by Mr. Adolfo Cozza in excavating at Pompeii with the object of tracing the site of the port where, in his opinion, three-

fourths of the population sought escape from the eruption of Mount Vesuvius, hoping that the Roman fleet would be able to remove them into safety. After various try-pits had been sunk he discovered plaster and concrete, and finally a road leading to the sea showing signs of the passage of wheels. The masonry-work of a harbour was then unearthed with the marks left by the waves. The port which has just been discovered is at a distance of about 1300 yards from the existing seashore and about 700 yards from the ruined city. It is covered with a layer about 23 ft. deep, consisting of earth, lava, ashes, and *lapilli*. Further excavations will, it is thought, bring to light the skeletons of the majority of the population of Pompeii as well as treasures of gold and works of art.

A LARGE Etruscan necropolis, containing several skeletons, as well as vases and terra-cottas, dating from the seventh century B.C., has been discovered near Civita Vecchia in Italy, on the coast of Latium.

A CURIOUS story comes from Ireland that Mr. E. S. Dodgson, of Jesus College, Oxford, has discovered at Killult, Falcarragh, Donegal, a stone said to contain an Ogham inscription giving a clue to a great treasure concealed in the neighbourhood by an ancient Irish chieftain. The stone is being examined by Mr. R. Macalister. We wish the discoverer success in unearthing the treasure, but until he succeeds, or some other interpretation of the supposed inscription is suggested, it may be well to reserve opinion on the matter.

A RECENT message from San Francisco stated that the Falcon and Hope Islands of the Tonga group had disappeared. The information was brought by Capt. Trask of the steamship *Sonoma*, from Sydney, who is reported to have said:—"One of the regular trading steamships between Sydney and the Tonga group reported the sinking of the islands. The vessel steamed to where Falcon Island should have been, but it was nowhere in sight. Just before this the instruments at Sydney naval station showed that several violent earthquake shocks had taken place about 2000 miles north-east of Sydney." With reference to the foregoing message, Mr. Basil A. Thomson (who acted for a time as Prime Minister of Tonga), wrote to *The Times* on September 14 that the news should be received with reserve for the reasons, "first, that Falcon had already ceased to exist as an island fourteen years ago; and, second, that Hope Island, better known by its native name of Niufo'ou ('New Niua'), is reported to have disappeared whenever a serious volcanic disturbance shakes the nerves of the white residents of Tongatabu."

THE Museum Journal of the University of Pennsylvania announces in its March issue the despatch of an expedition, under charge of Dr. Farabee, to explore the primitive tribes of the Amazon forests. The Brazilian Government promises active assistance to Dr. Farabee and his staff. From Para they will proceed to Manaos, and from thence ascend the Rio Negro, the largest tributary of the Amazon from the north-west. The examination of this region will

occupy the attention of the expedition for six months or perhaps a year. The collections to be made will consist of weapons, utensils, and all objects relating to the arts of life procurable among the various tribes to be visited. They are destined to supply material for future research, and especially to enable the museum to reproduce the actual life of some of the most interesting native tribes, soon destined to disappear.

In No. 2, vol. xxiv., of *Folk-lore* we have the final, but unhappily fragmentary, dissertation by the late Mr. Andrew Lang, in which he develops his theory of the origin of exogamy and totemism. Following Darwin, he assigns the beginnings of exogamy to the expulsion by the sires of the group of the younger males. He assumes that the establishment of totemic groups and practices cannot have been sudden; men cannot have, all in a moment, conceived that each group possessed a protective and sacred animal or other object. But if each group woke to the consciousness that it bore the name of a plant or animal, and did not know how it came to bear that name, no more was needed to establish a belief in the essential and valuable connection of the group with certain animals, birds, or other objects. These names, he thinks, originated in sobriquets given by one group to another. In this exposition he is in general agreement with the views of Dr. A. C. Haddon in his address delivered before the British Association at the Belfast meeting in 1902.

In *Man* for September Mr. W. J. Lewis Abbott describes a collection of pygmy flint implements made by Mr. J. M. Bain from the base of the sand-dunes at Fishhook, Cape Colony. They closely resemble the series presented by Miss Nina Layard to the Ipswich Museum. Mr. Abbott believes that this is the result of culture-transmission. "It is obvious," he believes, "that the prototypes of these shapes could not have arisen in a country where the native material did not lend itself to their manufacture; but in one where a homogeneous silica, such as flint, was the common indigenous material; and in following up the search for these interesting little objects, we shall be getting together the material to show the migrations of this old race over the face of the earth, and perhaps be able to trace it to its cradle."

In the Philadelphia Museum Journal for June Dr. Arno Poebel, of Johns Hopkins University, announces an important discovery among the collection of clay tablets obtained at Nippur during the years 1888-1900, which are now being arranged for exhibition. One tablet, unfortunately imperfect, gives a version of the Creation story, in which the origin of the first human beings is attributed to the gods Enlil and Enki, and the goddess Ninharsagga—a question which has led to much speculation among Assyrian and biblical scholars. In the present version, when Enlil, the creator of heaven and earth, wished to people the world with human beings, the god Enki, the deity of wisdom and knowledge, devised the image of man after the image of the gods, and the goddess Ninharsagga moulded it in clay, while the blood of Enlil

gave it life and intellect. Whether the idea that Enlil cut off his head will be corroborated from other cuneiform sources we cannot tell at present. Meanwhile the present discovery is obviously of the highest importance.

IN the May number of *The Irish Naturalist* (vol. xxii., No. 5), Mr. N. Colgan gives an interesting account of the renascence flora of certain areas on Killiney Hill, Co. Dublin, formerly covered with old gorse but burnt out in July, 1911. Three months after the fire the burnt areas showed thirteen species of flowering plants, partly survivals from old root-stocks, partly immigrants from adjacent unburnt areas, and partly perhaps the product of seeds that had retained their vitality throughout the fire. Later observations showed that eighteen months after the fire a renascence flora of sixty-four species, including nine cryptogams, had taken possession of the areas burnt clear of all vegetation. Of these species, forty-five had certainly or very probably entered from adjacent unburnt areas, thirteen were survivals, and the remaining six could not with certainty be placed among either immigrants or survivals, and are classed as of doubtful origin. The cryptogams covered much more ground than the flowering plants, the most abundant species, dominating above all other plants in the burnt ground flora, were the mosses *Funaria hygrometrica* and *Barbula fallax*; other common bryophytes were three species of *Polytrichum* and the liverwort *Marchantia polymorpha*; while two species of the lichen genus *Parmelia* were also frequently found. Among the phanerogamic immigrants the grasses were strongly predominant, and the immigrant flora as a whole consisted largely of plants provided with special adaptations for seed dispersal, one of the most prominent of these plants being *Senecio sylvaticus*. The most interesting fact arising from this new flora is the conflict between its higher and lower members, the phanerogams and the cryptogams, the latter having so far kept in check the much more varied phanerogamic flora. The probable successive changes in the vegetation are outlined by the author.

WE have received a reprint of an interesting paper by Dr. C. B. Crampton, "The Use of Geology to the Forester" (*Trans. Argyll Foresters and Gardeners*, 1912), pointing out some of the geological facts that have a bearing upon the nature and origin of the various types of surface occupied by plants, and emphasising the importance to foresters in particular of a knowledge of the nature of the ground under his charge in so far as it reacts with the vegetation, and the reasons for differences in the surface and in these reactions. The author indicates the geographical and geological factors upon which depends the nature of a habitat for trees or other plants, with special reference to the action of gravity in screes and landslips, the erosive action of wind and streams, coastal erosion, glacial erosion and deposition, and the characters of soils and subsoils.

IN a recent number of *The Herts Advertiser* it is stated that, in consequence of Dr. Sambon's remarks on pellagra at a recent meeting of the British Medical

Association, Dr. Blandy, of the Lunatic Asylum at Napsbury, near St. Albans, undertook an examination of the patients in that institution, with the result that no fewer than eleven were found to be suffering from that disease. As the majority of these come from the moist, low-lying district of the Colne Valley, support is afforded to the opinion that the disease is propagated by insects.

AS a result of the examination of the large series of specimens of mammals and birds collected in East Africa by the Roosevelt and other American expeditions, very considerable additions have been made recently to the list of species and races from that area, the descriptions having been published for the most part in various issues of the Smithsonian Miscellaneous Collections. The latest of these papers include one by Mr. E. Heller (vol. lxi., No. 7), on new races of antelopes, and another, by Mr. E. A. Mearns (*ibid.*, No. 9) on new weaver-birds. As regards the antelopes, it must suffice to mention that some of the new races are founded on very slight differences from previously known forms, and it is thus rendered difficult to see where the modern fashion for excessive splitting is to stop.

IN connection with the preceding paragraph, it may be mentioned that in the current issue of the Zoological Society's Proceedings three additions are made by Messrs. Barrett-Hamilton and Hinton to the British mammal-fauna, all three being from the Inner Hebrides. The most interesting of these is a shrew-mouse (*Sorex granti*), distinguishable at a glance from the common English *S. araneus* by the contrast presented by the light-coloured flanks to the dusky upper parts. As it also exhibits certain dental peculiarities, its right to specific rank seems undoubted. The other are field-mice; one (*Evotomys alstoni*) a species from Mull, and the other (*Microtus agrestis macgillivraii*) a race from Islay.

THE September number of *The Museums Journal* contains an illustrated account of Mr. J. A. C. Dean's method of "showing" objects in museums and art galleries to blind persons, as explained at the Hull meeting of the Museums Association. The method appears to have attained considerable success, and to have awakened a new interest in the class for which it is intended. It may be remarked—as indeed was hinted by the president at the close of the discussion—that if this mode of demonstration is adopted in up-to-date zoological museums it will be necessary for each to have a separate series of stuffed specimens for this purpose.

IN the *Verhandlungen der Naturforschenden Gesellschaft in Basel* (Bd. xxiv.) will be found a paper by the late Fr. Burckhardt, entitled "Die Stellung des Osterfestes im christlichen Kalender." It is a contribution to the historical side of the question, and contains several original documents of some interest. An extract from the writings of Luther is given, in which he advocates a fixed date for Easter, not merely without regard to the moon's phases, but also, like Christmas, without regard to the days of the week. Other documents refer to the adoption of the reformed

calendar by the Protestants in Switzerland. Practical convenience forced them to follow the Gregorian calendar in the main, though not until the end of the seventeenth century, and even then one difference was maintained. This arose from basing the calculation of the Easter full moon on the Rudolfine Tables instead of the Gregorian Epact. The first discrepancy occurred in the year 1724, when the Gregorian full moon fell on Sunday, April 9, while the Tables gave the day preceding. The question was referred for decision to the Protestant Conference at Ratisbon early in 1723, and the Basel authorities sought the advice of John Bernoulli. The replies are reproduced in full. In the result Easter was celebrated by Catholics and Protestants on successive Sundays in 1724 and again in 1744. Agreement was finally brought about by an order of Frederic the Great in 1776 on the basis of the Gregorian calendar. The desirability of a fixed Easter has been commonly felt from the time of the Gregorian reform, and it was the last act of Father Denza, late director of the Vatican Observatory, to prepare a memorandum on the subject for Pope Leo XIII. His proposal was to adopt the third Sunday following the vernal equinox, which would limit Easter between April 4 and 11.

THE Director-General of Observatories (India) has issued a memorandum dated August 9 on the monsoon conditions prevailing during June and July, with anticipations for August and September. From the recent data regarding the conditions most likely to be of influence, and which are stated in detail, the unfavourable factors appear to predominate slightly. But the inferences drawn are (a) that the total rainfall of the months in question will probably be normal or in slight defect, (b) that in north-west India the monsoon is not likely to be affected prejudicially by snow-fall. (The fall of temperature and dry north-westerly winds that usually follow widespread and heavy snow-fall have not been experienced.) The above forecast agrees practically with that issued on June 8 (*NATURE*, August 7).

DR. NILS EKHOLM has contributed an important article on the weather in the North Sea during the first half of June, 1911, illustrated by synoptic charts, to No. 64 of the Occasional Publications issued under the authority of the International Council for the Study of the Sea. The period is chosen because the council had then six hydrographical expeditions stationed in that sea. The author prefaces his inquiry by a careful historical summary of the development of meteorology and its methods from the invention of the barometer to the present time, and with a description of barometric changes and their relation to wind and weather, in which we were pleased to see that the valuable pioneer work of Admiral FitzRoy, the first chief of the Meteorological Office, is duly recognised. The author explains that the difficulties with which modern conceptions of cyclones and anticyclones have to contend led him to supplement the usual isobaric charts by plotting the $\pm$ differences of barometric readings since the last observation, and thus constructing "isallobars," or lines of equal differences. He remarks, *inter alia*, that a close study of the move-

ments of the isallobars shows that pressure changes are the primary, and cyclonic and anticyclonic whirls the secondary phenomena. The charts for the North Sea for the above period and two other cases are discussed upon those principles.

DR. H. GEIGER, of the Reichsanstalt, who four years ago, in conjunction with Prof. Rutherford, devised a method of counting the number of α particles emitted by a radio-active body, has now, according to a communication from the Reichsanstalt, succeeded in perfecting a very simple method which allows both the α and β particles to be counted. The α or β rays are allowed to enter a short metal cylinder 2 cm. diameter, by a small hole in the base. Through an ebonite block which closes the other end of the cylinder a sharp pointed rod projects into the cylinder to within 0.8 cm. of the base. The cylinder is raised to about 1200 volts, and the pointed rod is connected to a string electrometer provided with a high-resistance leak. The entry of either an α or a β particle into the cylinder causes a spark to pass between point and cylinder, and the electrometer of 10 cm. capacity acquires a charge corresponding to 10-20 volts. The throws of the electrometer are recorded photographically, and the results obtained are in agreement with those calculated from ionisation observations in the case of the polonium preparation used in the observations.

Engineering for September 5 contains an illustrated account of the Sulzer-Diesel locomotive built by Messrs. Sulzer Brothers at Winterthur, in the early part of this year, and supplied to the Prusso-Hessian State Railway, Berlin. This is the first locomotive fitted with Diesel engines, and is designed for fast traffic. The length over-all is 54.5 ft., and the weight in working order is 95 tons. The main engines are of the reversible two-cycle type, single-acting, having two pairs of cylinders inclined at 90° to each other. The pistons are 15 in. diameter by 21.7 in. stroke. Running at 304 revolutions per minute, a speed of sixty-two miles per hour is obtained. The auxiliary machinery required is of a somewhat complicated character. Trials have been made, and show that the engine is adaptable to a wide range of work. It is reported that the change from air to oil-fuel is accomplished without trouble at a speed of about six miles per hour, and that the reversing arrangements were equally successful.

Engineering of the same date has an article dealing with problems of the internal-combustion locomotive, in which further reference is made to the Sulzer-Diesel locomotive. Our contemporary considers that any locomotive engineer reading the full description of this engine would be somewhat appalled at the extraordinary amount of machinery the type involves. The main engine requires another engine, of one-quarter or one-fifth of its power, to make it start at all. The second engine, also of Diesel type, requires similar provision in the way of air and circulating-water supply, &c., to the main engines, involving pumps for the supply of starting air, scavenging air, injection air, fuel to each cylinder, jacket water, circulating water for pistons, and for lubrication of bear-

ings, &c. A comparison of this collection of machinery with that in a modern steam locomotive is greatly in favour of the latter. Neither does the Diesel locomotive appear to show up any too well as a power plant; one horse-power is developed for about 190 lb. weight. A modern steam locomotive develops one horse-power for about 100 lb. of engine weight, or for every 140 to 150 lb. of combined engine and tender weight. Rapid perfecting of this type of engine is not to be expected, but it is to be hoped that the efforts instituted on the Continent will be persisted in. The greater the initial handicap, the more glorious the ultimate victory.

ATTENTION may be directed to a slight error in the date assigned to Messrs. Cartailhac and Breuil's monograph on "La Caverne d'Altamira"; the frontispiece bears the date 1906, but this work was not published until 1908.

OUR ASTRONOMICAL COLUMN.

THE ROTATING ELLIPSOID RU CAMELOPARDALIS.—The elaborate investigations recently carried out by Prof. H. N. Russell upon the treatment of photometric observations of variable stars have been the means of bringing to light a new class of these bodies. By taking into account the hypothetical, but, of course, quite possible ellipticity of the components of a binary system, a method was developed which may be applied equally well to the case of an isolated rotating ellipsoid—an early stage in the development of a binary system. At Princeton during the last two years the light changes of three stars—S Antliæ, SZ Tauri, and RU Camelopardalis—have been explained in the most satisfactory way on the hypothesis that they are rotating ellipsoids. In Bulletin No. 21 of the Lays Observatory Mr. Harlow Shapley discusses 292 photometric measures of the third of these stars, and comes to the conclusion that "the light variations . . . can be satisfactorily accounted for on the hypothesis of a single, uniformly luminous, ellipsoidal body rotating in a period of 44.344 days." With regard to the spectrum of this star the author quotes a letter from Prof. E. C. Pickering to the effect that it is peculiar and apparently variable, and that Miss Cannon thinks it may belong to class N.

The publication of the curves and results for S Antliæ and SZ Tauri is promised for the near future. As both these stars have spectra of classes much less prone to variability of a physical character the realisation of this promise will be awaited with great interest.

THE DIMINUTION OF THE SOLAR RADIATION IN 1912.—Further evidence regarding the existence of a widespread atmospheric opacity during 1912 appears in a note by M. Ladislas Gorczyński in the *Comptes rendus* (vol. clvii., No. 1). The pyrheliometer record made at Varsovie shows that during the latter half of the year there was a marked falling off in the intensity of the solar radiation. The detailed measures, we are informed, show that the depression lasted from about the middle of June, 1912, to the middle of January, 1913, and was most severe in September. Similar results were obtained at the Meteorological Observatory of Olczedajów, and it is pointed out that analogous records were obtained at Mount Weather.

COMET 1913b (METCALF).—A supplement to *Astronomische Nachrichten*, No. 4679, contains a continuation of the ephemeris of this comet which was given last week, after the first approximate elements com-

puted by Prof. Kobold. The comet is slowly increasing in brightness, according to the ephemeris, but on September 3 it was observed as of magnitude 9.5, and on September 4 as of magnitude 10.0.

12h. M.T. Berlin.									
R.A.					Dec.		Mag.		
h. m. s.									
Sept. 18	...	6	6	18	...	+67°	23' 5"	...	—
19	...	6	0	47	...	68	8' 6"	...	10.3
20	...	5	54	43	...	68	54' 0"	...	—
21	...	5	47	58	...	69	39' 4"	...	—
22	...	5	40	26	...	70	24' 3"	...	—
23	...	5	32	2	...	71	8' 8"	...	10.3
24	...	5	22	42	...	71	52' 9"	...	—

COMET 1913c (NEUJMIN).—This comet when first observed (September 3) was thought to be a minor planet, but later observation has suggested its cometary nature. Herr M. Ebell has computed the elements from the observations of September 6, 7, and 8, and these, with an ephemeris, have been communicated in a Kiel circular. They are as follows:—

T = 1913 July 22.5755 M. T. Berlin.

$\omega = 320^\circ 56' 70''$

$\Omega = 347^\circ 19' 42''$ 1913.0.

$i = 12^\circ 22' 97''$

$\log q = 0.11296$

Ephemeris for 12h. M.T. Berlin.

R.A.					Dec.		Mag.
h. m. s.							
Sept. 18	...	22 43	10	...	+4° 9' 3	...	—
19	...	22 42	40	...	4 27.7	...	—
20	...	22 42	10	...	4 45.5	...	11.2

According to Dr. Graff, at Bergedorf, the comet showed a short tail on September 6, but on September 8, from observations made at Pulkova, the object was recorded as stellar.

NEW LABORATORY SPECTROSCOPIC RESULTS.—The physical laboratory of the Imperial College of Science and Technology is responsible for four different spectroscopic researches recently communicated to the Proceedings of the Royal Society (Ser. A., vol. lxxxix., pp. 125-149). Mr. L. C. Martin, a research student, writes on a band spectrum attributed to carbon monosulphide, and has found a new spectrum consisting of a number of bands degraded to the less refrangible side, the wave-lengths of which he gives in his paper. Prof. Fowler records new series of lines in the spark spectrum of magnesium incidentally tying up the well-known spark line at $\lambda 4481$ in one of the series. In conjunction with Mr. W. H. Reynolds, research student, Prof. Fowler has another paper on additional triplets and other series lines in the spectrum of magnesium. Eight additional triplets have been measured in the spectrum of magnesium arc *in vacuo*, six belonging to the diffuse and two to the sharp series. Four additional members of the Rydberg series of single lines have been photographed, and four strong solar lines of unknown origin have been identified with lines of the Rydberg series. Two known lines, 5711.31 and 4730.21 , have been coupled up in a series with 4354.53 , a previously unrecorded line. Mr. W. E. Curtis, the demonstrator of astrophysics, has a paper on a new band spectrum associated with helium, but the question of its origin is still doubtful, as hydrogen was present in all the tubes examined. A list is given of the wave-lengths determined. A search in celestial spectra was made, owing to its association with helium, but the result was negative.

THE PERTH OBSERVATORY SECTION OF THE ASTROGRAPHIC CHART.—Vols. ii. and iii. of the Perth Observatory (Western Australia) section of the astrographic chart have just come to hand. These volumes are two out of the thirty-six volumes which will be published. The region of the sky assigned to this